

**WHAT IS CLAIMED IS:**

1           1. A method for matching a response intensity of a sensor array to an  
2 odorant with the detection threshold of a human nose to said odorant, said method  
3 comprising:

4                 exposing said odorant to an array of sensors to produce said response  
5 intensity, thereby matching said response intensity of said sensor array to said detection  
6 threshold of said human nose.

1           2. A method in accordance with claim 1, wherein said sensor array  
2 comprises at least two sorption-based sensors which are members selected from the group  
3 consisting of a chemiresistors, a conducting/nonconducting regions sensor, a SAW  
4 sensor, a metal oxide gas sensor, a bulk conducting polymer sensor, a Langmuir-Blodgett  
5 film sensor, and combinations thereof.

1           3. A method in accordance with claim 2, wherein said sensor is a  
2 conducting/nonconducting regions sensor.

1           4. A method in accordance with claim 2, wherein said sensor is a bulk  
2 conducting polymer sensor.

1           5. A method in accordance with claim 3, wherein said nonconducting  
2 region is an organic polymer.

1           6. A method in accordance with claim 5, wherein said organic  
2 polymer is a member selected from the group consisting of (poly(4-vinyl phenol), poly( $\alpha$ -  
3 methyl styrene), poly(vinyl acetate), poly(sulfone), poly(caprolactone), poly(ethylene-co-  
4 vinyl acetate), poly(ethylene oxide), poly(ethylene), poly(butadiene), poly(vinylidene  
5 fluoride), poly(n-butyl methacrylate), poly(epichlorohydrin) and poly(ethylene glycol)).

1           7. A method in accordance with claim 1, wherein said odorant is a  
2 member selected from the group consisting of alkanes, alkenes, alkynes, dienes, alicyclic  
3 hydrocarbons, arenes, alcohols, ethers, ketones, aldehydes, carbonyls, carbanions,  
4 heterocycles, polynuclear aromatics, organic derivatives, biomolecules, microorganisms,  
5 bacteria, viruses, sugars, nucleic acids, isoprenes, isoprenoids, fatty acids and their  
6 derivatives.

1           8. A method in accordance with claim 1, wherein said response  
2 intensity of said sensor array to said odorant is inversely proportional to the vapor  
3 pressure of said odorant.

1           9. A method for validating that a sensor array response intensity  
2 matches a human nose detection threshold, the method comprising:  
3           (a) contacting said sensor array with a constant fraction of a known vapor  
4 pressure of a first odorant to produce a first response intensity;  
5           (b) contacting said sensor array with said constant fraction of a known  
6 vapor pressure of a second odorant to produce a second response intensity; and  
7           (c) comparing said first response intensity to said second response  
8 intensity, thereby validating that said sensor array response intensity matches said human  
9 nose detection threshold.

1           10. A method in accordance with claim 9, wherein said sensor array  
2 comprises at least two sorption-based sensors which are members selected from the group  
3 consisting of a chemiresistors, a conducting/nonconducting regions sensor, a SAW  
4 sensor, a metal oxide gas sensor, a bulk conducting polymer sensor, a Langmuir-Blodgett  
5 film sensor, and combinations thereof.

1           11. A method in accordance with claim 10, wherein said sensor is a  
2 conducting/nonconducting regions sensor.

1           12. A method in accordance with claim 10, wherein said sensor is a  
2 bulk conducting polymer sensor.

1           13. A method in accordance with claim 11, wherein said  
2 nonconducting region is an organic polymer.

1           14. A method in accordance with claim 13, wherein said organic  
2 polymer is a member selected from the group consisting of (poly(4-vinyl phenol), poly( $\alpha$ -  
3 methyl styrene), poly(vinyl acetate), poly(sulfone), poly(caprolactone), poly(ethylene-co-  
4 vinyl acetate), poly(ethylene oxide), poly(ethylene), poly(butadiene), poly(vinylidene  
5 fluoride), poly(n-butyl methacrylate), poly(epichlorohydrin) and poly(ethylene glycol)).

1           15. A method in accordance with claim 9, wherein said odorant is a  
2 member selected from the group consisting of alkanes, alkenes, alkynes, dienes, alicyclic  
3 hydrocarbons, arenes, alcohols, ethers, ketones, aldehydes, carbonyls, carbanions,  
4 heterocycles, polynuclear aromatics, organic derivatives, biomolecules, microorganisms,  
5 bacteria, viruses, sugars, nucleic acids, isoprenes, isoprenoids, fatty acids and their  
6 derivatives.

1           16. A method in accordance with claim 9, wherein said first response  
2 intensity is greater than said second response intensity if said first vapor pressure is lower  
3 than said second vapor pressure and said fraction is not constant.

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